General

Guideline Title

Major trauma: service delivery.

Bibliographic Source(s)

National Clinical Guideline Centre. Major trauma: service delivery. London (UK): National Institute for Health and Care Excellence (NICE); 2016 Feb 17. 21 p. (NICE guideline; no. 40).

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

The wording used in the recommendations in this guideline (for example, words such as 'offer' and 'consider') denotes the certainty with which the recommendation is made (the strength of the recommendation) and is defined at the end of the "Major Recommendations" field.

NICE has developed four related clinical guidelines and one service delivery guideline related to the management of people with traumatic injuries including this guideline on major trauma service delivery and the following guidelines:

- Fractures (complex): assessment and management
- Fractures (non-complex): assessment and management
- Major trauma: assessment and initial management
- Spinal injury: assessment and initial management

Recommendations below apply to both children (under 16s) and adults (16 or over) unless otherwise specified.

Pre-hospital Triage

Recommendations for Ambulance Trust Boards, Medical Directors and Senior Managers in Ambulance Trusts

Provide a pre-hospital major trauma triage tool to differentiate between patients who should be taken to a major trauma centre and those who should be taken to a trauma unit for definitive management.

Choose a pre-hospital major trauma triage tool that includes assessment of physiology and anatomical injury and takes into account the different needs of older patients, children and other high-risk populations (such as patients who take anticoagulants, pregnant women and patients with comorbidities).

Support pre-hospital care providers using the major trauma triage tool with immediate clinical advice from the ambulance control centre.

Train pre-hospital care providers to use the major trauma triage tool.

Monitor and audit use of the major trauma triage tool as part of the major trauma network's quality improvement programme.

Transferring Patients with Major Trauma

Recommendations for Pre-hospital Care Providers

Be aware that the optimal destination for patients with major trauma is usually a major trauma centre. In some locations or circumstances intermediate care in a trauma unit might be needed for urgent treatment, in line with agreed practice within the regional trauma network.

Spend only enough time at the scene to give immediate life-saving interventions.

Divert to the nearest trauma unit if a patient with major trauma needs a life-saving intervention, such as drug-assisted rapid sequence induction of anaesthesia and intubation, that cannot be delivered by the pre-hospital team.

Recommendations for Senior Doctors and Nurses in Trauma Units

Spend only enough time to give life-saving interventions at the trauma unit before transferring patients for definitive treatment.

Be aware that the major trauma centre is the ultimate destination for definitive treatment.

Pre-alert Procedures

Recommendations for Medical Directors, Senior Managers and Senior Pre-hospital Care Providers within a Trauma Network

Provide a structured system for recording and receiving pre-alert information. Ensure that the information recorded includes:

- Age and sex of the injured person
- Time of incident
- Mechanism of injury
- Injuries suspected
- Signs, including vital signs, and Glasgow Coma Scale
- Treatment so far
- Estimated time of arrival at emergency department
- Special requirements
- The ambulance call sign, name of the person taking the call and time of call

Recommendation for Pre-hospital Care Providers

Ensure that pre-hospital documentation, including the recorded pre-alert information, is made available to the trauma team quickly and placed in the patient's hospital notes.

Recommendations for Senior Managers and Senior Doctors and Nurses in Emergency Departments

Ensure that a senior nurse or trauma team leader receives the pre-alert information and determines the level of trauma team response according to agreed and written local guidelines.

Ensure that the trauma team leader is easily identifiable to receive the handover and the trauma team is ready to receive the information.

Procedures for Receiving Patients in Trauma Units and Major Trauma Centres

Recommendations for Senior Managers in Trauma Units

Ensure that multispecialty trauma teams are activated immediately in trauma units to receive patients with major trauma.

Do not use a tiered team response in trauma units.

Have a paediatric trauma team available immediately for children (under 16s) with major trauma.

Recommendations for Senior Managers and Senior Doctors and Nurses in Major Trauma Centres

Consider a tiered team response to receive patients in major trauma centres. This may include:

- A standard multispecialty trauma team or
- A standard multispecialty trauma team plus specialist involvement (for example, code red for major haemorrhage) and mobilisation of supporting departments and services such as transfusion, interventional radiology and surgery

Have a paediatric trauma team available immediately for children (under 16s) with major trauma.

Transfer between Emergency Departments

Recommendations for Ambulance and Hospital Trust Boards, Medical Directors and Senior Managers

Provide a protocol for the safe and rapid transfer of patients who need definitive specialist intervention.

Train clinical staff involved in the care of patients with major trauma in the transfer protocol.

Review the transfer protocol regularly.

Recommendations for Senior Managers in Hospital Trusts and Senior Doctors and Nurses in Emergency Departments

Ensure that patients with major trauma who need critical interventions at a major trauma centre leave the sending emergency department within 30 minutes of the decision to transfer.

Organisation of Hospital Major Trauma Services

Recommendations for Hospital Trust Boards, Senior Managers and Commissioners

Hospital major trauma services should have responsibility and authority for the governance of all major trauma care in hospital.

Provide a dedicated major trauma service for patients with major trauma that consists of:

- A dedicated trauma ward for patients with multisystem injuries
- A designated consultant available to contact 24 hours a day, 7 days a week who has responsibility and authority for the hospital trauma service and leads the multidisciplinary team care
- Acute specialist trauma rehabilitation services
- Acute specialist services for the paediatric and elderly populations
- A named member of clinical staff (a key worker, often a senior nurse) assigned at each stage of the care pathway who coordinates the patient's care

Recommendation for Senior Managers and Key Workers in Major Trauma Centres

The key worker should:

- Act as a single point of contact for patients, family members and carers, and the healthcare professionals involved in their care
- Provide information on how the hospital and the trauma system works (major trauma centres, trauma units and teams)
- Attend ward rounds and ensure that all action plans from the ward round are carried out in a timely manner
- Provide patient advocacy
- Ensure that there is a management plan and identify any conflicts
- Organise ongoing care including discharge planning, transfers and rehabilitation

Documentation

The NGC summary of the NICE guideline Major trauma: assessment and initial management contains recommendations for healthcare professionals on documentation.

Recommendations for Ambulance and Hospital Trust Boards, Senior Managers and Commissioners Within a Trauma Network

Ensure that pre-hospital documentation is standardised within a trauma network, for example using the Royal College of Physicians' Professional guidance on the structure and content of ambulance records.

Ensure that hospital documentation is standardised within a trauma network and there are systems that allow healthcare professionals access to all relevant and current clinical data at different points in the care pathway. This could be by using compatible electronic medical records such as a picture archiving and communication system (PACS) and an image exchange portal.

Monitoring and Audit

Recommendations for Ambulance and Hospital Trust Boards, Medical Directors, Senior Managers and Commissioners

Ensure that there is a major trauma audit programme to evaluate systems, services and processes as part of the major trauma network's quality improvement programme.

Ensure that a major trauma audit programme includes:

- Regular review of audits undertaken locally and regionally
- Registration with the Trauma Audit and Research Network (TARN)
- Accurate and complete data submission to TARN
- Quarterly review of TARN reports

A national trauma audit system should collect and analyse data to enable providers of major trauma services to review their local, regional and national major trauma performance.

Information and Support for Patients, Family Members and Carers

The NGC summary of the NICE guideline Major trauma: assessment and initial management contains recommendations for healthcare professionals on information and support.

Recommendation for Ambulance and Hospital Trust Boards, Senior Managers and Commissioners

Establish a protocol for providing information and support to patients, family members and carers.

Recommendations for Healthcare Professionals Providing Information to People with Major Trauma in the Emergency Department

The trauma team structure should include a clear point of contact for providing information to patients, family members and carers.

Document all key communications with patients, family members and carers about the management plan.

Allocate a dedicated member of staff to contact the next of kin and provide support for unaccompanied children and vulnerable adults.

For patients who are being transferred from an emergency department to another centre, provide verbal and written information that includes:

- The reason for the transfer
- The location of the receiving centre and the patient's destination within the receiving centre
- The name and contact details of the person who was responsible for the patient's care at the initial hospital

Training and Skills

Recommendations for Ambulance and Hospital Trust Boards, Medical Directors and Senior Managers Within Trauma Networks

Ensure that each healthcare professional within the trauma service has the training and skills to deliver, safely and effectively, the interventions they are required to give, in line with the NGC summaries of the NICE guidelines Fractures (non-complex): assessment and management, Fractures (complex): assessment and management, Major trauma: assessment and initial management and Spinal injury: assessment and initial management.

Enable each healthcare professional who delivers care to patients with major trauma to have up-to-date training in the interventions they are required to give.

Provide education and training courses for healthcare professionals who deliver care to children (under 16s) with major trauma that include the following components:

- Safeguarding
- Taking into account the radiation risk of computed tomography (CT) to children when discussing imaging for them
- The importance of the major trauma team, the roles of team members and the team leader, and working effectively in a major trauma team
- Managing the distress families and carers may experience and breaking bad news
- The importance of clinical audit and case review

Access to Major Trauma Services

Recommendation for Ambulance and Hospital Trust Boards, Senior Managers and Commissioners

Ensure that people with major trauma have access to services that can provide the interventions recommended in this guideline and the NGC summaries of the NICE guidelines Fractures (non-complex): assessment and management, Fractures (complex): assessment and management, Major trauma: assessment and initial management and Spinal injury: assessment and initial management. See the appendix of the original guideline document for the recommendations for pre-hospital and hospital management of major trauma that might have particular implications for service delivery.

Drug-Assisted Rapid Sequence Induction of Anaesthesia and Intubation – Recommendation for Ambulance and Hospital Trust Boards, Medical Directors and Senior Managers

Ensure that drug-assisted rapid sequence induction of anaesthesia and intubation (RSI) is available for patients with major trauma who cannot maintain their airway and/or ventilation, and be aware that RSI should:

- Be performed as soon as possible and within 45 minutes of the initial call to the emergency services and
- Preferably be provided at the scene of the incident and not by diverting to a trauma unit

For more information see "Airway Management in Pre-hospital and Hospital Settings" in the NGC summary of the NICE guideline Major trauma: assessment and initial management.

Interventional Radiology and Definitive Open Surgery – Recommendation for Hospital Trust Boards, Medical Directors and Senior Managers

Ensure that interventional radiology and definitive open surgery are equally and immediately available for haemorrhage control in all patients with active bleeding. (For more information see "Interventional Radiology" in the NGC summary of the NICE guideline Major trauma: assessment and initial management and "Controlling Pelvic Haemorrhage" in the NGC summary of the NICE guideline Fractures (complex): assessment and management.

Definitions

Strength of Recommendations

Some recommendations can be made with more certainty than others. The Guideline Committee makes a recommendation based on the trade-off between the benefits and harms of an intervention, taking into account the quality of the underpinning evidence. For some interventions, the Guideline Committee is confident that, given the information it has looked at, most patients would choose the intervention. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

Interventions That Must (or Must Not) Be Used

The Guideline Committee usually uses 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally the Guideline Committee uses 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

Interventions That Should (or Should Not) Be Used – a 'Strong' Recommendation

The Guideline Committee uses 'offer' (and similar words such as 'refer' or 'advise') when confident that, for the vast majority of patients, an intervention will do more good than harm, and be cost effective. The Guideline Committee uses similar forms of words (for example, 'Do not offer…') when confident that an intervention will not be of benefit for most patients.

Interventions That Could Be Used

The Guideline Committee uses 'consider' when confident that an intervention will do more good than harm for most patients, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the patient's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time

considering and discussing the options with the patient.

Clinical Algorithm(s)

A National Institute for Health and Care Excellence (NICE) pathway titled "Trauma overview" is provided on the NICE Web site .

Scope

Disease/Condition(s)

Major trauma, defined as an injury or a combination of injuries that are life-threatening and could be life changing because it may result in long-term disability

Guideline Category

Evaluation

Management

Risk Assessment

Clinical Specialty

Anesthesiology

Critical Care

Emergency Medicine

Internal Medicine

Neurological Surgery

Nursing

Orthopedic Surgery

Pediatrics

Radiology

Thoracic Surgery

Intended Users

Advanced Practice Nurses

Emergency Medical Technicians/Paramedics

Health Care Providers

Hospitals

Nurses

Patients

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To address service delivery issues that stakeholders have identified as needing further clarification in the trauma networks, with the key service areas identified as: access to services, appropriate destination, continuity of care, documentation and transfer of information, audit, and provision of information

Target Population

Adults, young people and children who present with a major traumatic injury or a suspected major traumatic injury

Note: The following groups are not covered by this guideline: people who do not have a suspected or confirmed major traumatic injury, people with burns, and people with spinal injuries.

Interventions and Practices Considered

1. Pre-hospital triage
    - Choosing and using a pre-hospital major trauma triage tool
    - Providing training in use of a triage tool
    - Monitoring and auditing use of the major trauma triage tool
2. Transferring patients with major trauma
    - Major trauma centre as primary destination versus urgent care in trauma unit
    - Providing immediate life-saving interventions at the scene and in the trauma unit
3. Providing a structured system for recording and receiving pre-alert information
4. Procedures for receiving patients in trauma units and major trauma centres
    - Ensuring that multispecialty trauma teams are activated immediately in trauma units to receive patients with major trauma
    - Using a tiered team response to receive patients in major trauma centres
    - Paediatric trauma teams in trauma units and trauma centres
5. Transfer between emergency departments
    - Use of transfer protocol
    - Ensuring rapid (i.e., within 30 minutes) transfer from emergency department to major trauma centre
6. Organisation of hospital major trauma services
    - Providing a dedicated major trauma service
    - Duties and responsibilities of key workers in major trauma centres
7. Documentation
    - Ensuring that pre-hospital documentation is standardised within a trauma network
    - Ensuring that hospital documentation is standardised within a trauma network
8. Monitoring and audit
    - Ensuring that there is a major trauma audit programme to evaluate systems, services and processes
    - Components of a major trauma audit programme
9. Information and support for patients, family members and carers
    - Establishing a protocol for providing information and support to patients, family members and carers
    - Establishing key contact persons
    - Providing verbal and written information to patients when transfers occur
10. Training and skills
    - Ensuring that healthcare professionals within the trauma service have the training and skills to deliver, safely and effectively, the required interventions

    - Enabling healthcare professionals who deliver care to patients with major trauma to have up-to-date training in the required interventions
11. Ensuring that people with major trauma have access to services
12. Drug-assisted rapid sequence induction of anaesthesia and intubation
    - Ensuring that drug-assisted rapid sequence induction of anaesthesia and intubation (RSI) is available for patients with major trauma who cannot maintain their airway and/or ventilation
    - Ensuring that interventional radiology and definitive open surgery are equally and immediately available for haemorrhage control in all patients with active bleeding

Major Outcomes Considered

- Health-related quality of life
- Mortality
- Functional scales that measure level of disability
- Return to normal functioning
- Number and length of healthcare contacts
- Time to treatment
- Length of hospital stay
- Place of residence at 90 days
- Staff views and satisfaction
- Patient views and satisfaction
- Cost-effectiveness

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Developing the Review Questions and Outcomes

Review questions were developed within a PICO framework (patient, intervention, comparison and outcome) for intervention reviews. Review questions were developed within a framework of population, prognostic factor and outcomes for prognostic reviews, and within a framework of population, index tests, reference standard and target condition for reviews of diagnostic test accuracy. The purpose of this was to guide the literature searching process, critical appraisal and synthesis of evidence, and to facilitate the development of recommendations by the Guideline Development Group (GDG). They were drafted by the NCGC technical team and refined and validated by the GDG. The questions were based on the key clinical areas identified in the scope (see Appendix A).

A total of 14 review questions were identified.

Full literature searches, critical appraisals and evidence reviews were completed for all the specified review questions.

Searching for Evidence

Clinical Literature Search

The aim of the literature search was to systematically identify all published clinical evidence relevant to the review questions. Searches were undertaken according to the parameters stipulated within the NICE Guidelines Manual (2012) (see the "Availability of Companion Documents" field). Databases were searched using medical subject headings and free-text terms. Foreign language studies were not reviewed and, where possible, searches were restricted to articles published in the English language. All searches were conducted in MEDLINE, EMBASE, and the Cochrane Library, and were updated for the final time between 19 March and 31 March 2015. No papers added to the databases after this date were considered.

Search strategies were quality assured by cross-checking reference lists of highly relevant papers, analysing search strategies in other systematic reviews, and asking GDG members to highlight any additional studies. The questions, the study types applied, the databases searched, and the years covered can be found in Appendix F.

The titles and abstracts of records retrieved by the searches were sifted for relevance, with potentially significant publications obtained in full text. These were then assessed against the inclusion criteria.

Health Economic Literature Search

Systematic searches were undertaken to identify relevant health economic evidence within the published literature. The National Health Service Economic Evaluation Database (NHS EED), the Health Economic Evaluations Database (HEED) and Health Technology Assessment (HTA) database were searched using broad population terms and no date restrictions. A search was also run in MEDLINE and EMBASE using a specific economic filter with population terms. Where possible, searches were restricted to articles published in the English language. Economic search strategies are included in Appendix F. All searches were updated for the final time between 19 March and 31 March 2015 except in HEED which ceased production in 2014. No papers added to the databases after this date were considered.

Evidence Gathering and Analysis

The tasks of the research fellow are listed below and described in further detail in the full version of the guideline. The research fellow:

> Identified potentially relevant studies for each review question from the relevant search results by reviewing titles and abstracts, and deciding which should be ordered as full papers. Full papers were then obtained.
> Reviewed full papers against pre-specified inclusion/exclusion criteria to identify studies that addressed the review question in the appropriate population, and reported on outcomes of interest (see Appendix C for review protocols)

Inclusion and Exclusion Criteria

The inclusion and exclusion of studies was based on the criteria defined in the review protocols (see Appendix C). Excluded studies by review question (with the reasons for their exclusion) are listed in Appendix J. The GDG was consulted about any uncertainty regarding inclusion or exclusion.

The key population inclusion criterion was:

> Major trauma is defined as an injury or a combination of injuries that is/are life-threatening and could be life-changing because it may result in long-term disability.

The key population exclusion criterion was:

- People who do not have a suspected or confirmed major traumatic injury
- People with burns
- People with spinal injuries (this will be covered in the NGC summary of the NICE guideline Spinal injury: assessment and initial management)

Conference abstracts were not automatically excluded from any review. No relevant conference abstracts were identified for this guideline. Literature reviews, posters, letters, editorials, comment articles, unpublished studies and studies not in the English language were excluded.

Type of Studies

Randomised trials, non-randomised trials, and observational studies (including diagnostic or prognostic studies) were included in the evidence reviews as appropriate.

For most intervention reviews in this guideline, parallel randomised controlled trials (RCTs) were included because they are considered the most

robust type of study design that could produce an unbiased estimate of the intervention effects. Crossover RCTs were not considered appropriate for any of the questions. If non-randomised studies were appropriate for inclusion, i.e., non-drug trials with no randomised evidence, the GDG identified a priori in the protocol the variables which must either be equivalent at baseline or that the analysis had to adjust for any baseline differences. If the study did not fulfil either criterion, it was excluded. See Appendix C for full details on the study design of studies selected for each review question.

For diagnostic reviews, diagnostic RCTs, cross-sectional and retrospective studies were included. For prognostic reviews, prospective and retrospective cohort studies were included. Case–control studies were not included.

Where data from observational studies were included, the results for each outcome were presented separately for each study and meta-analysis was not conducted.

Evidence of Cost-effectiveness

The GDG is required to make decisions based on the best available evidence of both clinical and cost-effectiveness. Guideline recommendations should be based on the expected costs of the different options in relation to their expected health benefits (that is, their 'cost-effectiveness') rather than the total implementation cost. Thus, if the evidence suggests that a strategy provides significant health benefits at an acceptable cost per patient treated, it should be recommended even if it would be expensive to implement across the whole population.

Evidence on cost effectiveness related to the key clinical issues being addressed in the guideline was sought. The health economist:

- Undertook a systematic review of the published economic literature
- Undertook new economic analysis in priority areas

Literature Review

The health economist:

- Identified potentially relevant studies for each review question from the economic search results by reviewing titles and abstracts – full papers were then obtained
- Reviewed full papers against pre-specified inclusion/exclusion criteria to identify relevant studies (see below for details)

Inclusion and Exclusion Criteria

Full economic evaluations (studies comparing costs and health consequences of alternative courses of action: cost–utility, cost-effectiveness, cost-benefit and cost-consequence analyses) and comparative costing studies that addressed the review question in the relevant population were considered potentially applicable as economic evidence.

Studies that only reported cost per hospital (not per patient) or only reported average cost-effectiveness without disaggregated costs and effects were excluded. Abstracts, posters, reviews, letters/editorials, foreign language publications and unpublished studies were excluded. Studies judged to have an applicability rating of 'not applicable' were excluded (this included studies that took the perspective of a non-Organisation for Economic Co-operation and Development [OECD] country).

Remaining studies were prioritised for inclusion based on their relative applicability to the development of this guideline and the study limitations. For example, if a high quality, directly applicable UK analysis was available other less relevant studies may not have been included. Where exclusions occurred on this basis, this is noted in the relevant section.

For more details about the assessment of applicability and methodological quality see the economic evaluation checklist (The Guidelines Manual, Appendix H) and the health economics review protocol in Appendix C.

Number of Source Documents

See Appendix D: Clinical Article Selection and Appendix E: Economic Article Selection (see the "Availability of Companion Documents" field) for detailed flow charts on the article selection process, including total number of records identified through database searching, records screened, records excluded, full-text articles assessed for eligibility, studies included in review, and studies excluded from review.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Overall Quality of Outcome Evidence in Grading of Recommendations Assessment, Development and Evaluation (GRADE)

Level	Description
High	Further research is very unlikely to change confidence in the estimate of effect.
Moderate	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.
Low	Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.
Very Low	Any estimate of effect is very uncertain.

Methods Used to Analyze the Evidence

Meta-Analysis

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Evidence Gathering and Analysis

The tasks of the research fellow are listed below and described in further detail in the full version of the guideline. The research fellow:

- Critically appraised relevant studies using the appropriate study design checklists as specified in the NICE Guidelines Manual (2012) (see the "Availability of Companion Documents" field).
- Critically appraised relevant studies with a qualitative study design checklist produced by NCGC (see Appendix P).
- Extracted key information about interventional study methods and results using Evibase, NCGC purpose-built software. Evibase produces summary evidence tables, with critical appraisal ratings. Key information about non-interventional study methods and results were manually extracted onto standard evidence tables and critically appraised separately (see Appendix G for the evidence tables).
- Generated summaries of the evidence by outcome. Outcome data is combined, analysed and reported according to study design:
    - Randomised data is meta-analysed where appropriate and reported in Grading of Recommendations Assessment, Development and Evaluation (GRADE) profiles.
    - Observational data is presented as a range of values in GRADE profiles.
    - Diagnostic data is meta-analysed if appropriate, or presented as a range of values in adapted GRADE profiles.
    - Prognostic data is meta-analysed where appropriate and reported in GRADE profiles.
    - Qualitative data is summarised across studies where appropriate and reported in themes.
- A sample of a minimum of 20% of the abstract lists of the first three sifts by new reviewers were double-sifted by a senior research fellow. As no papers were missed by any reviewers, no further double-sifting was carried out. All of the evidence reviews were quality assured by a senior research fellow. This included checking:
    - Papers were included or excluded appropriately
    - A sample of the data extractions
    - Correct methods were used to synthesise data
    - A sample of the risk of bias assessments

Methods of Combining Evidence

Data Synthesis for Intervention Reviews

Where possible, meta-analyses were conducted to combine the data from the studies for each of the outcomes in the review question using RevMan5 software.

All analyses were stratified for age (under 18 years and 18 years or over), which meant that different studies with predominant age groups in different age strata were not combined and analysed together. For some questions additional stratification was used, and this is documented in the individual question protocols (see Appendix C). If additional strata were used, this led to sub-strata (for example, two stratification criteria would lead to four sub-strata categories, or three stratification criteria would lead to nine sub-strata categories) which would be analysed separately.

Analysis of Different Types of Data

See Section 4.3.3.1 of the full version of the guideline for details regarding analysis of different types of data including dichotomous outcomes, continuous outcomes, generic inverse variance, heterogeneity, and complex analysis/further analysis.

Data Synthesis for Diagnostic Test Accuracy Reviews

Two separate review protocols were produced to reflect the two different diagnostic study designs:

Diagnostic Randomised Controlled Trials (RCTs)

Diagnostic RCTs (sometimes referred to as test and treat trials) are a randomised comparison of two diagnostic tests, with study outcomes being clinically important consequences of diagnostic accuracy (patient outcomes similar to those in intervention trials, such as mortality). Patients are randomised to receive test A or test B, followed by identical therapeutic interventions based on the results of the test (i.e., someone with a positive result would receive the same treatment regardless of whether they were diagnosed by test A or test B). Downstream patient outcomes are then compared between the two groups. As treatment is the same in both arms of the trial, any differences in patient outcomes will reflect the accuracy of the tests in correctly establishing who does and does not have the condition. Diagnostic RCTs were searched for first in preference to diagnostic accuracy studies. Data was synthesised using the same methods for intervention reviews (see dichotomous or continuous outcomes in Section 4.3.3.1 of the full version of the guideline).

Diagnostic Accuracy Studies

For diagnostic test accuracy studies, a positive result on the index test was found if the patient had values of the measured quantity above or below a threshold value, and different thresholds could be used. Diagnostic test accuracy measures used in the analysis were: area under the receiver operating characteristics (ROC) curve and, for different thresholds (if appropriate), sensitivity and specificity. The threshold of a diagnostic test is defined as the value at which the test can best differentiate between those with and without the target condition and, in practice, it varies amongst studies. For this guideline, sensitivity was considered more important than specificity due to the consequences of a missed injury. Coupled forest plots of sensitivity and specificity with their 95% confidence intervals (CIs) across studies (at various thresholds) were produced for each test, using RevMan. In order to do this, 2x2 tables (the number of true positives, false positives, true negatives and false negatives) were directly taken from the study if given, or else were derived from raw data or calculated from the set of test accuracy statistics.

Diagnostic meta-analysis was conducted where appropriate, that is, when 5 or more studies were available per threshold. Test accuracy for the studies was pooled using the bivariate method modelled in Winbugs®. The bivariate method uses logistic regression on the true positives, true negatives, false positives and false negatives reported in the studies. Overall sensitivity and specificity and confidence regions were plotted (using methods outlined by Novielli et al.). For scores with less than five studies, median sensitivity and the paired specificity were reported where possible. If an even number of studies were reported the lowest value of the two middle pairs was reported.

Area under the ROC curve (AUC) data for each study was also plotted on a graph, for each diagnostic test. The AUC describes the overall diagnostic accuracy across the full range of thresholds. The following criteria are used for evaluating AUC:

- ≤0.50: worse than chance
- 0.50–0.60: very poor
- 0.61–0.70: poor
- 0.71–0.80: moderate
- 0.81–0.92: good
- 0.91–1.00: excellent or perfect test

Heterogeneity or inconsistency amongst studies was visually inspected in the forest plots where there were similar thresholds.

Data Synthesis for Risk Prediction Rules

Evidence reviews on risk prediction rules/tools results were presented separately for discrimination and calibration. The discrimination data was analysed according to the principles outlined under the section on data synthesis for diagnostic accuracy studies. Calibration data, e.g., R^2, if reported was presented separately to the discrimination data. The results were presented for each study separately along with the quality rating for the study. Inconsistency and imprecision were not assessed.

Data Synthesis for Qualitative Reviews

For each included paper sub-themes were identified and linked to a generic theme. An example of a sub-theme identified by patients and carers is 'keeping an open channel of communication about reasons for any delays in the emergency room' and this is linked to a broader generic theme of 'information'. In some cases, sub-themes would relate to more than one generic theme. A summary evidence table of generic themes and underpinning sub-themes was then produced alongside the quality of the evidence.

Appraising the Quality of Evidence by Outcomes

Interventional Studies

The evidence for outcomes from the included RCT and observational studies were evaluated and presented using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group . The software (GRADEpro) developed by the GRADE working group was used to assess the quality of each outcome, taking into account individual study quality and the meta-analysis results.

Details of how the four main quality elements (risk of bias, indirectness, inconsistency and imprecision) were appraised for each outcome are given in the full version of the guideline. Publication or other bias was only taken into consideration in the quality assessment if it was apparent.

Overall Grading of the Quality of Clinical Evidence

Once an outcome had been appraised for the main quality elements, as above, an overall quality grade was calculated for that outcome. The scores from each of the main quality elements (0, −1 or −2) were summed to give a score that could be anything from 0 (the best possible) to -8 (the worst possible). However scores were capped at −3. This final score was then applied to the starting grade that had originally been applied to the outcome by default, based on study design. For example, all RCTs started as High and the overall quality became Moderate, Low or Very low if the overall score was −1, −2 or −3 points respectively. The significance of these overall ratings is explained in the "Rating Scheme for the Strength of the Evidence" field. The reasons or criteria used for downgrading were specified in the footnotes of the GRADE tables.

On the other hand, observational interventional studies started at Low, and so a score of −1 would be enough to take the grade to the lowest level of Very low. Observational studies could, however, be upgraded if there was: a large magnitude of effect, a dose-response gradient, and if all plausible confounding would reduce a demonstrated effect.

See Sections 4.3.4.2 to 4.3.4.4 and Tables 5 and 6 in the full version of the guideline for additional details on grading of quality of evidence for prognostic and diagnostic studies and for qualitative reviews.

Assessing Clinical Importance

The Guideline Development Group (GDG) assessed the evidence by outcome in order to determine if there was, or potentially was, a clinically important benefit, a clinically important harm or no clinically important difference between interventions. To facilitate this, binary outcomes were converted into absolute risk differences (ARDs) using GRADEpro software: the median control group risk across studies was used to calculate the ARD and its 95% confidence interval (CI) from the pooled risk ratio.

The assessment of clinical benefit, harm, or no benefit or harm was based on the point estimate of absolute effect for intervention studies which was standardised across the reviews. The GDG considered for most of the outcomes in the intervention reviews that if at least 100 participants per 1000 (10%) achieved (if positive) the outcome of interest in the intervention group compared to the comparison group then this intervention would be considered beneficial. The same point estimate but in the opposite direction would apply if the outcome was negative. For the critical outcomes of mortality any reduction represented a clinical benefit. For adverse events 50 events or more represented clinical harm. For continuous outcomes if the mean difference was greater than the minimally important difference then this resented a clinical benefit or harm. For outcomes such as mortality any reduction or increase was considered to be clinically important.

This assessment was carried out by the GDG for each critical outcome, and an evidence summary table was produced to compile the GDG's assessments of clinical importance per outcome, alongside the evidence quality and the uncertainty in the effect estimate (imprecision).

Clinical Evidence Statements

Clinical evidence statements are summary statements that are presented after the GRADE profiles, summarising the key features of the clinical effectiveness evidence presented. The wording of the evidence statements reflects the certainty/uncertainty in the estimate of effect. The evidence statements were presented by outcome and encompassed the following key features of the evidence:

- The number of studies and the number of participants for a particular outcome
- An indication of the direction of clinical importance (if one treatment is beneficial or harmful compared to the other or whether there is no difference between the two tested treatments)
- A description of the overall quality of evidence (GRADE overall quality)

Evidence of Cost-effectiveness

Evidence on cost effectiveness related to the key clinical issues being addressed in the guideline was sought. The health economist:

- Undertook a systematic review of the economic literature
- Undertook new cost-effectiveness analysis in priority areas

Literature Review

The health economist:

- Critically appraised relevant studies using the economic evaluations checklist as specified in The Guidelines Manual
- Studies initially considered eligible but which were then excluded can be found in Appendix K with reasons for exclusion explained

Undertaking New Health Economic Analysis

As well as reviewing the published economic literature for each review question, new economic analysis was attempted by the health economist in priority areas. Priority areas for new health economic analysis were agreed by the GDG after formation of the review questions and consideration of the available health economic evidence.

As this was a service delivery guideline, the model attempted tried to cover various areas of the clinical pathway including their interactions; novel methods such as conceptual modelling were used to initiate this work. The various stages and approach adopted are described in more detail in Chapter 6 in the full version of the guideline and Appendix M.

Additional systematic reviews to inform the modelling activity were conducted and these are presented in Appendix L. Model structure, inputs and assumptions were explained to and agreed by the GDG members during meetings, and they commented on subsequent revisions.

See Appendix M for details of the health economic analysis/analyses attempted for the guideline.

Cost-effectiveness Criteria

NICE's report 'Social value judgements: principles for the development of NICE guidance' sets out the principles that GDGs should consider when judging whether an intervention offers good value for money. In general, an intervention was considered to be cost effective if either of the following criteria applied (given that the estimate was considered plausible):

a. The intervention dominated other relevant strategies (that is, it was both less costly in terms of resource use and more clinically effective compared with all the other relevant alternative strategies), or
b. The intervention cost less than £20,000 per quality-adjusted life-year (QALY) gained compared with the next best strategy

If the GDG recommended an intervention that was estimated to cost more than £20,000 per QALY gained, or did not recommend one that was estimated to cost less than £20,000 per QALY gained, the reasons for this decision are discussed explicitly in the 'from evidence to recommendations' section of the relevant chapter with reference to issues regarding the plausibility of the estimate or to the factors set out in the 'Social value judgements: principles for the development of NICE guidance'.

In the Absence of Economic Evidence

When no relevant published studies were found, and a new analysis was not prioritised, the GDG made a qualitative judgement about cost-effectiveness by considering expected differences in resource use between options and relevant UK National Health Service (NHS) unit costs, alongside the results of the clinical review of effectiveness evidence.

The UK NHS costs reported in the guideline are those that were presented to the GDG and were correct at the time recommendations were drafted. They may have changed subsequently before the time of publication. However, the GDG has no reason to believe they have changed substantially.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Who Developed the Trauma Guidelines?

The four clinical guidelines and service delivery guidance consist of related topics with overlap in populations and key clinical areas for review. The guidelines have been developed together to avoid overlap and ensure consistency. This required careful planning to ensure the Guideline Development Groups (GDGs) had the support they needed. Senior clinical expertise was recruited in addition to the standard GDG.

Project Executive Team

The overlap in the content of the four clinical guidelines and the service delivery guidance required an approach that ensured coherence and avoided duplication across the guidelines. To address this, clinical experts from across the guidelines were recruited to form an umbrella group, the Project Executive Team (PET). The PET met quarterly throughout the development of the guidelines. At the PET meetings, the members provided expert advice to the technical team and GDG on the crossover of reviews across guidelines.

Guideline Development Group Expert Members

Expert members were healthcare professionals who worked across the four clinical guidelines and the service delivery guidance, and attended the GDGs that were relevant to their expertise. The expert members provided an additional level of coherence across the guidelines, helping to identify potential duplication in the areas of their expertise.

Guideline Development Group (GDG)

Each guideline 'stands alone' and addresses a specific area of care. A dedicated, multidisciplinary GDG, comprising health professionals, researchers and lay members developed this guidance.

The GDG was convened by the NCGC in accordance with guidance from NICE. The GDG met for two days every 6 weeks during the development of the guideline.

Staff from the NCGC provided methodological support and guidance for the development process. The technical team working on the guideline included a project manager, systematic reviewers, health economists and information scientists. The team undertook systematic searches of the literature, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the GDG.

Developing Recommendations

Over the course of the guideline development process, the GDG was presented with:

- Evidence tables of the clinical and economic evidence reviewed from the literature. All evidence tables are in Appendix G.
- Summary of clinical and economic evidence and quality as presented in Chapters 6-17 in the full version of the guideline
- Forest plots and summary receiver operating characteristics (ROC) curves (see Appendix I)
- A description of the methods and results of the cost-effectiveness analysis undertaken for the guideline (see Appendix M)

Recommendations were drafted on the basis of the GDG interpretation of the available evidence, taking into account the balance of benefits, harms and costs. When clinical and economic evidence was of poor quality, conflicting or absent, the GDG drafted recommendations based on their expert opinion. The considerations for making consensus based recommendations include the balance between potential harms and benefits,

economic or implications compared to the benefits, current practices, recommendations made in other relevant guidelines, patient preferences and equality issues. The consensus recommendations were done through discussions in the GDG. The GDG also considered whether the uncertainty was sufficient to justify delaying making a recommendation to await further research, taking into account the potential harm of failing to make a clear recommendation.

The main considerations specific to each recommendation are outlined in the Evidence to Recommendation Section preceding the recommendation section in the full version of the guideline.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

Some recommendations can be made with more certainty than others. The Guideline Committee makes a recommendation based on the trade-off between the benefits and harms of an intervention, taking into account the quality of the underpinning evidence. For some interventions, the Guideline Committee is confident that, given the information it has looked at, most patients would choose the intervention. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

Interventions That Must (or Must Not) Be Used

The Guideline Committee usually uses 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally the Guideline Committee uses 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

Interventions That Should (or Should Not) Be Used – a 'Strong' Recommendation

The Guideline Committee uses 'offer' (and similar words such as 'refer' or 'advise') when confident that, for the vast majority of patients, an intervention will do more good than harm, and be cost effective. The Guideline Committee uses similar forms of words (for example, 'Do not offer…') when confident that an intervention will not be of benefit for most patients.

Interventions That Could Be Used

The Guideline Committee uses 'consider' when confident that an intervention will do more good than harm for most patients, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the patient's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time considering and discussing the options with the patient.

Cost Analysis

Economic evidence is provided for each review question in the full version of the guideline (see the "Availability of Companion Documents" field).

See also the "Availability of Companion Documents" field for Appendix M: Major Trauma Service Delivery Systems Model (see below for a short description of this model).

Background to Analytic Framework and Conceptual Modelling

The analytic framework of the trauma service guidance evaluative process was based on the premise that all parts of a service system are interconnected to an extent. Through processes of iterative refinement the Guideline Development Group (GDG) sought to simplify the service system by assessing the strength of association between different components of the system and identify which, if any, of the components could be evaluated as distinct entities using traditional National Institute for Health and Care Excellence (NICE) methodologies of systematic review. The remaining components were considered as candidate topics which could benefit from exploration through systems modelling. The stages undertaken in the conceptual modelling exercise have been defined in Chapter 6 of the full version of the guideline.

Conclusions

The original model planned for this guideline could not be conducted due to the lack of data to inform the most important parameters of the model, including the accuracy of the triaging tools currently used in practice. For this reason, the recommendations for the scope areas (application of triage tools, pre-alert, trauma team response, access to airway management, access to interventional radiology for haemorrhage control) anticipated to be supported by the model were made using the evidence identified and the GDG expert opinion. The GDG decided not to

recommend any specific tool but to make a research recommendation instead.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Validation Process

The guidance is subject to an eight week public consultation and feedback as part of the quality assurance and peer review the document. All comments received from registered stakeholders are responded to in turn and posted on the National Institute for Health and Care Excellence (NICE) Web site when the pre-publication check of the full guideline occurs.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Refer to the "Type of Studies" section in the "Description of Methods Used to Collect/Select the Evidence" field for a description of the studies that support the recommendations.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Reduced variation in major trauma care in England

See the "Trade-off between clinical benefits and harms" sections in the full version of the guideline (see the "Availability of Companion Documents" field) for benefits of specific interventions.

Potential Harms

- The Guideline Development Group (GDG) discussed the variation in diagnostic outcomes between the triage tools that are used in both adults and children, and believed this was due to different criteria required for triggering the tools. The GDG discussed how many of the tools would result in unacceptable under and/or over triage rates.
- There is a trade-off between over triaging and under triaging. If the initial triaging decision is incorrect, the patient could incur critical delay in reaching the appropriate service to treat their condition. Under triaging is associated with potential clinical harm as patients would have a delay in the appropriate treatment (assumed to be provided only in a major trauma centre), and in addition there will be costs of transfer of such patients to the appropriate place of treatment and additional downstream costs associated with clinical complications associated with delayed treatment. Whilst over triage to a major trauma centre does not carry safety risks to the patient concerned, inappropriate trauma team activation can cause disruption to the major trauma centre hospital services detracting staff and diverting resources from other patients. In many geographical locations, the major trauma centre may be far from the patient's residence and unnecessary repatriation transfer costs to their local provider would be incurred. On the other hand, under triage could result in direct clinical harm for the patient as well as unnecessary resource use. However, the rarity of major traumatic incidents alongside the expertise available to stabilise at trauma units should be taken into account when considering the risk of under triage and subsequent absolute harm that may be incurred.
- The GDG centred discussions for a structured pre-alert information system around sensitivity (an indication of the false negative rate). False negatives (a negative test result when there is a major trauma) may cause considerable clinical and health economic harms. For example, failure to alert an emergency department to a major trauma patient could lead to unnecessary delay in treatment.

See the "Trade-off between clinical benefits and harms" sections in the full version of the guideline (see the "Availability of Companion Documents" field) for additional discussion of harms of specific interventions.

Qualifying Statements

Qualifying Statements

- The recommendations in this guideline represent the view of National Institute for Health and Care Excellence (NICE), arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The application of the recommendations in this guideline is not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.
- Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.
- Those responsible and accountable for commissioning trauma services should take this guideline fully into account. However, this guideline does not override the need for, and importance of, using professional judgement to make decisions appropriate to the circumstance.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Foreign Language Translations

Mobile Device Resources

Patient Resources

Resources

Slide Presentation

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

National Clinical Guideline Centre. Major trauma: service delivery. London (UK): National Institute for Health and Care Excellence (NICE); 2016 Feb 17. 21 p. (NICE guideline; no. 40).

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016 Feb 17

Guideline Developer(s)

National Clinical Guideline Centre - National Government Agency [Non-U.S.]

Source(s) of Funding

The National Clinical Guideline Centre (NCGC) was commissioned by the National Institute for Health and Care Excellence (NICE) to undertake the work on this guideline.

Guideline Committee

Guideline Development Group (GDG)

Composition of Group That Authored the Guideline

Guideline Development Group (GDG) Members: Bhaskar Basu, Consultant in Rehabilitation Medicine, University of South Manchester NHS Foundation Trust (from April 2014); Stephen Bennett, Patient member; Karim Brohi, Director, Centre for Trauma Sciences, Barts and the London School of Medicine, Queen Mary University of London; Alan Charters, Consultant Nurse, Paediatric Emergency Medicine (from November 2014); Chris Fitzsimmons, Consultant in Paediatric Emergency Medicine, Sheffield Children's Hospital NHS Foundation Trust; Bob Handley, Consultant Trauma and Orthopaedic Surgeon, Trauma Service, John Radcliffe Hospital Oxford; Karen Hoffman, Research Fellow and Occupational Therapist, Queen Mary University London; Heather Jarman, Clinical Director for Major Trauma and Consultant Nurse in Emergency Care, St George's University Hospitals NHS Foundation Trust, London; Fiona Lecky, Emergency Medicine Research, University of Sheffield Richard Lee Head of Clinical Services, Welsh Ambulance Service NHS Trust; Iain McFadyen, Consultant Trauma and Orthopaedic Surgeon, Royal Stoke University Hospital, University of North Midlands NHS Trust; David Skinner (*Chair*), Emeritus Consultant in Emergency Medicine, Oxford; Graham Stiff, GP and BASICS Pre Hospital Emergency Physician, Newbury, Berkshire; Anne Weaver, Consultant in Emergency Medicine and Pre-hospital Care, Royal London Hospital, London's Air Ambulance, Barts Health NHS Trust; John Whitehead,

Associate Specialist in Emergency Medicine, RD&E Foundation Healthcare Trust and Commissioner, South Devon and Torbay CCG; Keith Young, Patient member

Financial Disclosures/Conflicts of Interest

At the start of the guideline development process all Guideline Development Group (GDG) members declared interests including consultancies, fee-paid work, share-holdings, fellowships and support from the healthcare industry. At all subsequent GDG meetings, members declared new and arising conflicts of interest.

Members were either required to withdraw completely, or for part of the discussion, if their declared interest made it appropriate. The details of declared interests and the actions taken are shown in Appendix B (see the "Availability of Companion Documents" field).

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the National Institute for Health and Care Excellence (NICE) Web site. Also available for download in ePub or eBook formats from the NICE Web site.

Availability of Companion Documents

The following are available:

- Major trauma: service delivery. Full guideline. London (UK): National Institute for Health and Care Excellence; 2016 Feb. 203 p. (NICE guideline; no. 40). Available from the National Institute for Health and Care Excellence (NICE) Web site.
- Major trauma: service delivery. Appendices. London (UK): National Institute for Health and Care Excellence; 2016 Feb. (NICE guideline; no. 40). Available from the NICE Web site.
- Major trauma: service delivery. Costing report. London (UK): National Institute for Health and Care Excellence; 2016 Feb. 13 p. Available from the NICE Web site.
- Major trauma: service delivery. Baseline assessment tool. London (UK): National Institute for Health and Care Excellence; 2016 Feb. (NICE guideline; no. 40). Available from the NICE Web site.
- Major trauma: service delivery. Slide set. London (UK): National Institute for Health and Care Excellence; 2016 Mar. 82 p. (NICE guideline; no. 40). Available from the NICE Web site.
- The guidelines manual 2012. London (UK): National Institute for Health and Care Excellence (NICE); 2012 Nov. Available from the NICE Web site.

Patient Resources

The following is available:

- Major trauma: service delivery. Information for the public. London (UK): National Institute for Health and Care Excellence; 2016 Feb. 5 p. (NICE guideline; no. 40). Available from the National Institute for Health and Care Excellence (NICE) Web site. Also available for download in eBook and ePub formats from the NICE Web site. Also available in Welsh from the NICE Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a

licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on May 31, 2016.

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